NASA Technologies to Support SOLAR-B Science Goals

The Solar-B spacecraft, launched on September 22nd on the Japanese M-V rocket out of Kagoshima, Japan, contains a suite of three new instruments that will provide **new remote sensing** of the Sun during this three year mission. The NASA Solar Terrestrial Probes program at NASA is part of an international effort, led by the Japanese Aerospace Exploration Agency's (JAXA) Space Science Research Division, to provide these technologies for the Solar-B mission at about one-third the total cost of the mission (around $65M contributed by the Agency).

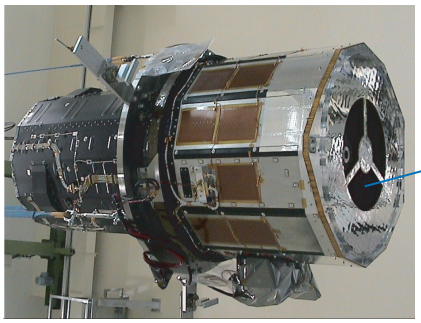
The Solar-B mission aims to answer several key science questions, including:

- why does a hot corona exist above the cool atmosphere?
- what drives events such as solar flares?
- and, what creates the Sun's magnetic fields?

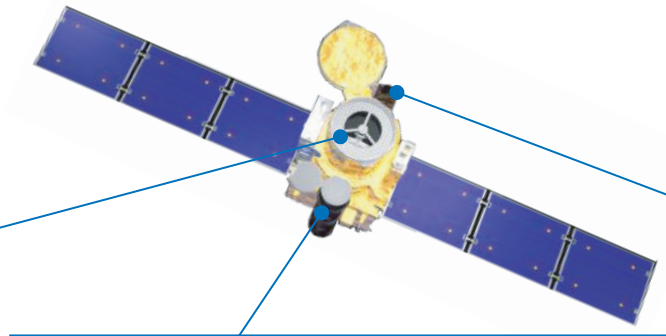
The answers to these and other questions will greatly improve our knowledge of how the Sun generates magnetic disturbances and high-energy particle storms that propagate from the Sun to the Earth and beyond; in this sense, Solar-B will help us predict "space weather."

Three Solar-B instruments will provide high temporal, spatial and velocity resolution of the Sun from the surface right through to the outer atmosphere, in order to study coronal heating, transient phenomena, and energy transfer between the photosphere and the corona:

Solar Optical Telescope (SOT)



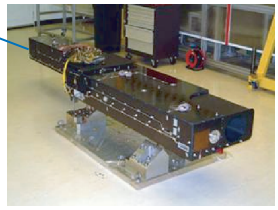
Developed in a collaborative effort by the National Astronomical Observatory of Japan, Lockeed Martin Advanced Technology Center, Mitsubishi Electric Corp, NCAR High Altitude Observatory, NASA MSFC, and JAXA. The SOT will provide an unprecedented 0.2 arcsec resolution of solar magnetic fields.



X-Ray Telescope (XRT)

Developed in a collaborative effort by the Smithsonian Astrophysical Observatory at Harvard University, NASA Marshall Space Flight Center, JAXA, and National Astronomical Observatory of Japan. The XRT will provide a spatial resolution 3x that of JAXA YOKKOH mission.

Extreme-ultraviolet Imaging Spectrometer (EIS)



Provided by the Mullard Space Science Laboratory at the University College of London. The EIS will provide a sensitivity 10x higher than that of the ESA SOHO mission.

Technologies onboard the 900 kg Solar-B spacecraft include:

- ultra-high spatial resolution optics and detectors (2K x 2K CCDs);
- the 50cm aperture Solar Optical Telescope, which has the largest aperture and is the most advanced solar telescope flown in space;
- lossless image compression with onboard data processing;
- space qualified linear polarimeters; and
- 0.1 arcsec solar pointing and tracking.

The satellite will be maintained in a sun-synchronous, polar orbit at 600 km and will be stable to 0.02 arcsec over 10 seconds. Data collected by a 3 Gbit solid state recorder will be down linked at 4 Mbps during X-band station over pass.